KOLLMORGEN®

Because Motion Matters™

KBM motors give packaging machines greater flexibility to maximize performance

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KBM series frameless brushless torque motors, the latest development in direct drive technology from Kollmorgen, allows packaging machine designers to create in-house innovative machine designs essentially out of the box. Traditionally, a designer starts by defining the machine's movement sequences, and then looks for a suitable motor from the supplier's range. This largely restricts the designer to the motor manufacturer's specifications in terms of length, diameter, feedback system, bearings and power supply. Now the machine designer can optimize his machine's performance by selecting from the large range of KBM sizes, and create a design with encoders or special bearings to suit his requirements. The availability of 14 frame sizes, 3-4 lengths per frame, windings for use with 24 V supply voltages or higher, and special designs for bearing, cooling and protection, guarantee optimum flexibility and the best possible solution for any packaging application.

With the KBM series' compact footprint and simple installation, the machine designer is able to fully integrate the motor into his machine and use the machine's bearings as the motor's bearings. This helps avoid complexity and excessive system compliance, reduces size and lowers cost. The machine can act as a heat sink and external air or water-cooling can also be integrated. This considerably increases the motor's available continuous torque, providing faster continuous operation and higher performance in the application.

With pre-existing motor designs, implementing changes of this kind is a tedious and time-consuming process for the designer and motor manufacturer. It also leads to compromised solutions. With KBM motors from Kollmorgen, the designer does not have to compromise; he defines the design and specifies the best solution for his application. One further advantage is that by using fewer, but highly efficient components the designer avoids the deficiencies of conventional motor/motor-gear solutions such as system compliance, vibration, and frequent system maintenance. A hollow shaft direct drive motor can also drive high inertia loads with large inertia ratios between the rotor and load, with improved dynamics, resulting in a degree of efficiency that is 15 percent greater than with a motor-gear solution. These characteristics provide greater precision, better machine uptime, and improved reliability, thereby increasing the productivity and service life of packaging machines and systems, while also providing investment security and competitiveness.

More flexibility for maximum productivity

An important step towards increasing productivity in packaging machines is greater flexibility, as the ability to package different products on the same line eliminates the need for additional lines. Hence, there is increasing demand for rapid automatic or manual changeovers for product and packaging format changes. The general tendency is towards a smaller, more efficient machine that occupies less floor space and uses fewer resources. These requirements for flexibility and multi-functionality are increased when considering the market's continuous demand for ever-improving machine utilization.

Developing such flexible packaging machines is also influenced by modern open system drive designs with integrated motion control and by decentralized drive and control technology. Increasingly, centralized, heavy, and mechanical drives are being replaced by servo or step motors. In order to achieve this higher level of functionality while remaining cost competitive, machine designers must leverage commonality of components across their machine.

Inspired by the latest technologies

The KBM series provides maximum torque density with minimal cogging to deliver highly dynamic operation over a broad speed range. The innovative electromagnetic technology of these motors is based upon decades of industry-proven innovation and provides a maximum torque density that minimizes the space required for the motor. The smooth rotation, minimal cogging, and low total harmonic distortion (THD) significantly reduce latching torques and vibration behavior. KBM motors more than meet the requirements for high performance, long service life, and simple integration.

Continuous torque ranges from 1.45 to 3,445 Nm, and peak torque from 4.91 to 12,812 Nm. In addition, the KBM motors' materials of construction satisfy the EC Directive and comply with RoHS and UL specifications making it easier for customers to certify their machine when the KBM motors are installed.

A standardized feedback system is available for use with Hall-effect sensors. These wear-free, contactless position sensors provide commutation signals on the strength of the magnetic field. Preset digital latching Hall-Effect sensors are installed at the factory at the stator's connection point. KBM motors contain additional axial rotor lengths to ensure accurate sensor activation at all times. The positive degree of freedom means that the motors can be adapted to each specific application. 2-dimensional axial movements are also possible.

14 sizes are available, with diameters ranging of from 60 to 825 mm, with 3 to 4 lengths each. KBM motors are also available with 150 standard windings, with a large number of available design options to satisfy low and high voltage applications, from 240 VAC up to 480 They provide power from 550 W to 18.5 kW for the very smallest motor design. KBM motors can achieve maximum speeds up to 18,600 RPM at rated power.

KBM components are quickly and easily integrated into machines. Comparative tests show that choosing suitable motors and combining them with controllers such as Kollmorgen's AKD™ servo drive provides outstanding results. The versatile AKD servo drive significantly improves the positioning accuracy and control characteristics of the motor, while further reducing energy usage thanks to extremely short cycle times. With such optimally paired motor and drive solutions, the motor data stored in the controller and the use of sophisticated control algorithms provide machine designers and users with even greater precision, optimized energy demand and, not least, a further increase in productivity.

Great benefits across the board

The compact design and high degree of integration of KBM motors satisfies the machine designer's demand for smaller and smaller machines. The ability to attach the drive directly to the load eliminates the need for bearings, mounting, and gears. This also increases reliability, lowers energy consumption and noise levels, and extends service life. By removing bearings and gears, motor service life and dynamics are also increased thanks to higher resolution and power range, and lower natural frequency. Further, KBM motors do not require any lubrication, which eliminates the potential for contamination, lowers maintenance costs, improves reliability and makes for more service-friendly machines compared to servo/gearbox systems.

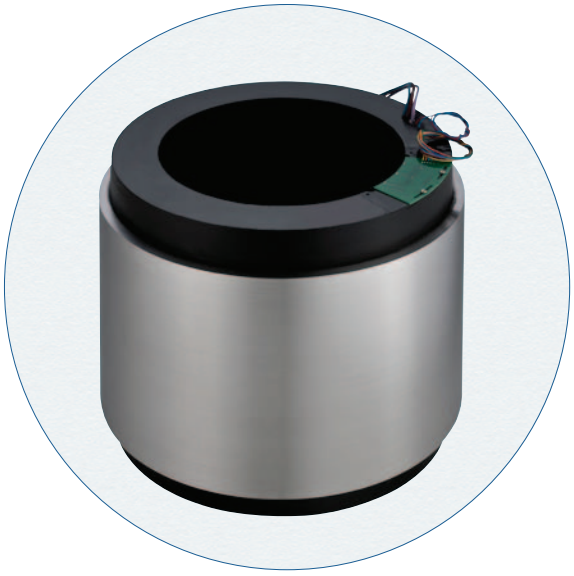
With their hollow shaft design, KBM motors provide the machine designer with a greater range of options to achieve a more compact structure at lower cost. As the feedback system is attached directly to the indexer, measurement takes place directly on the moving part. This structural measure also contributes to higher machine performance. Maintaining constant motor and machine temperatures also promotes machine performance and precision. Optional water-cooling is available.

A large number of available specifications and rapid availability of motor kits

Kollmorgen fully adheres to the "shared design" principle to achieve a very high degree of optimization across all models in order to provide the most appropriate and optimized solutions "out of the box". In addition to the range of configuration options that are available free of charge, KBM motors can be modified in a number of other ways to meet individual requirements. For example, if higher machine throughput is required, Kollmorgen can optimize KBM motors to suit each customer's needs by optimizing motor windings or other performance characteristics.

Relatively simple modifications on a purpose-built production platform can transform the motor components to meet particularly challenging and unique tasks, which makes it easier for machine designers to fit machines with the necessary power. Potential adaptations include motor windings, dimensional changes, rotor yoke materials, and stator sleeve construction materials. Motor windings can be optimized to reach the desired speed and torque performances to suit the power and current requirements in customer-specific applications. Rotors can be delivered with different, customer-specific, hole patterns and attachments, or with a smaller inner diameter. KBM motors are configured with a yoke made of cold-rolled and uncoated steel. However, Kollmorgen can supply customers with stainless steel or other options suitable for varying environments. The same applies to the stator sleeve, which comes in uncoated aluminum, but can be delivered with stainless steel.

In addition to the large range of available motor windings with optimized insulation characteristics, Customer-specific KBM designs are available on request. Product sizing and selection software along with 2D drawings and 3D models are available at www.kollmorgen.com/kbm to assist machine designers with electrical timing diagrams, detailed information on winding designs, and mechanical features.



Conclusion

With some thought and armed with the knowledge of coupling mechanisms, users can be equipped to effectively minimize EMI issues when best practices are not available.

About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders around the globe, with over 70 years of motion control design and application expertise. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.
For more informations contact us.

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